CERTIFICATE OF TRANSMISSION BY FACSIMILE (37 CFR 1.8) Applicant(s): Giovanardi et al.			Docket No. 2001-0111-01
Application No 09/916,360	Filing Date 7/26/01	Examiner C. Chau	Group Art Unit 2644

Invention. METHOD AND DEVICE FOR NOISE DAMPING - Appellant's Reply Brief -18 pgs; Facsimile Cover Sheet -1 pg

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Giovanardi et al.

Serial No.: 09/916,360

Filing Date: 7/26/01

Title: METHOD AND DEVICE FOR NOISE DAMPING

Examiner: C. Chau

Group Art Unit: 2644

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APPELLANTS' REPLY BRIEF

In response to Examiner's Answer mailed January 25, 2007, Appellants hereby present Appellants' Reply Brief. Previously, in response to a Final Office Action mailed April 19, 2006, Appellants submitted a Notice of Appeal and Pre-Appeal Brief Request in the above captioned application on July 12, 2006. In response, a Decision from the Pre-Appeal Brief Review was mailed August 28, 2006. Appellants presented Appellants' Corrected Appeal Brief on October 26, 2006 in response to the Notice of Non-Compliance dated October 6, 2006 with regard to our Appeal Brief of September 28, 2006.

(1) Real Party In Interest

The real party in interest in the above captioned application is Cymer, Inc. a corporation of the State of Nevada and the assignee of the above captioned application from the appellants, the named inventors.

(2) Related Appeals and Interferences

There are no related appeals or interferences.

(3) Status of the Claims

Claims 1, 3, 6-9, 11, 12, 15 and 18 are active and pending. Claims 16 and 17 were withdrawn from consideration and subsequently canceled. Claims 2, 4, 5, 10, 13, 14, 16, and 17 have been canceled.

(4) Status of Amendments

There have been no amendments filed after the July 19, 2006 Final Office Action.

(5) Summary of Claimed Subject Matter

As currently pending, independent claim 1 recites a device for reducing vibration in a section of material comprising an active damper located at a first distance from the material, a passive damper located at a second distance from the material, wherein the second distance is greater than the first distance, and a constraining layer in contact with the passive damper. Claim 18 recites a constraining means in contact with the passive damping means. This subject matter is illustrated in FIG. 2, such that active damping layer 201 is located closer to substrate 215 than the passive damping layer 205. A constraining layer 210 is in contact with the passive damping layer 205.

The independent claims are presented below with parenthetical references to specific related sections of the specification.

1. A device for reducing vibration in a section of material, said vibration causing an acoustic disturbance in a range of frequencies detectable by a target **[see paragraph 0013]** , the device comprising:

an active damper comprising an electroactive element **[201]** in electrical communication with an electrode **[see paragraph 0036]** , the active damper located a first distance **[see FIG. 2]** from said section of material **[215]**;

a passive damper **[205]** comprising a sound reducing material, said passive damper located a second distance **[see FIG. 2]** from said section of material **[215]**,

wherein said second distance is greater than said first distance**[see FIG. 2]** , and wherein at least one of the active damper and the passive damper reduces the magnitude of the acoustic disturbance reaching the target **[see paragraph 0026]** ; and

a constraining layer **[210]** disposed in contact with said passive damper **215]**.

15. A device for reducing audible noise in a vehicle by reducing vibration of a vehicle section, comprising:

an actuator attached to a surface of the vehicle section **[215]**, the actuator comprising at least one piezoelectric element **[201]** and at least one electrode **[not shown]**;

a viscoelastic portion **[205]** which is located outside **[see FIG. 2]** the actuator with respect to the surface of vehicle section **[215]**; and

a constraining layer **[210]** having a higher stiffness than said viscoelastic portion; wherein the at least one piezoelectric element and the at least one electrode are in electrical communication with each other **[see paragraph 0036]**; the constraining layer **210]** is in mechanical contact with the viscoelastic layer **[205]** and wherein the device functions to reduce noise by the actuator damping specific sound modes and by the viscoelastic portion damping all of the sound modes **[see paragraph 0026]**.

18. A method of damping vibration in a section of material, said vibration causing noise audible to a human ear, comprising the steps of:

bonding an actuator [see FIG. 2] having active damping means [201], passive damping means [205] and a constraining means [210] in contact with the passive damping means to a desired portion of the section of material [215];

activating the active damping means to damp low frequency vibration in the section of material [see paragraph 0062];

wherein the active damping means and the passive damping means together reduce noise to a greater extent than would be possible if the active damping means or the passive damping means act alone [see paragraph 0026].

(6) Grounds of Rejection to be Reviewed on Appeal

Claims 1, 3, 6, 9, 12, and 18 stand rejected under 35 USC as anticipated by US 6,700,304.

Claims 1, 7, 9, 15, and 18 stand rejected under 35 USC 102 as anticipated by US 5,315,203.

Claims 1, 7, 8, 9, 15, and 18 stand rejected under 35 USC 102 as anticipated by US 5,485,053.

Claim 7 stands rejected under 35 USC 103 as unpatentable over US 6,700,304 in view of 5,261,200.

Claim 8 stands rejected under 35 USC 103 as unpatentable over US 6,700,304 in view of 5,261,200 and further in view of US 6,501,644.

Claim 11 stands rejected under 35 USC 103 as unpatentable over US 6,700,304 in view of US Pub. No. 20020092699.

Claim 8 stands rejected under 35 USC 103 as unpatentable over US 5,315,203 in view of US 6,501,644.

(7) Argument

(A) Rejection under 35 USC §102(e) over U.S. Patent 6,700,304

(i) Claims 1, 3, 6, 9, 12, and 18 are argued together for purposes of this Appeal.

The Examiner has rejected claims 1, 3, 6, 9, 12 and 18 under 35 U.S.C. § 102(e) as being anticipated by *Fuller et al.* (US 6,700,304). The Examiner's rejection rests on his assertion that the "several thin sheets of lead stacked on top of each other" that are described as a distributed mass layer in the *Fuller et al.* reference constitute *both* a passive damper *and* a constraining layer in contact with the passive damper. Appellants respectfully disagree. In support of his proposition, the Examiner has indicated that Appellant has not clearly defined a constraining layer. Again, Appellants respectfully disagree.

The concept of a constraining layer is adequately explained in the specification of the present application such that a person of ordinary skill in the art would clearly understand its meaning. Moreover, all of the references cited by the Examiner, i.e., *Fuller et al.*, *Bicos* and *Baz* disclose and discuss the constraining layer concept, thus, further buttressing the fact that the meaning of the terms "constraining layer" and "constrained layer" have established meanings. As understood in the art, the purpose of the constraining layer is to fix a portion of the layer adjacent to it, thereby setting up an increased shear strain in the adjacent layer. See, *e.g.*, *Bicos* at col. 1, lines 9-35. See, also, *e.g.*, *Baz* at col. 1, lines 22-35 (regarding the understanding in the art of constrained layers).

With this established meaning, it is clear that a "mass layer comprising several thin sheets of lead, steel, aluminum, or composite fiberglass" as indicated in *Fuller et al.* do not constitute a constraining layer in contact with a passive damper. The contention in the Examiner's Response that "[i]f thin sheets are lead, then at least one sheet of lead reads on a passive damper and at least another one thin sheet of leas reads on a constraining layer" fails to make up for this deficiency. Examiner's Answer, page 13. As

stated above, Appellants contend that such an arrangement of multiple thin sheets of the same material does not indicate a constraining layer as understood in the art.

Moreover, Appellants further respectfully contend that it is incorrect for the Examiner to disregard the word "constraining" in claims 1 and 18 as being unclear, and instead, apply a reference that simply has a "layer" as applicable prior art. In short, Appellants respectfully assert that several thin sheets stacked on top of each (e.g., lead) other do not identically disclose a passive damper *and* a constraining layer in contact with the passive damper as recited in the claims.

Because *Fuller et al.* fail to teach or suggest a constraining layer in contact with a passive damper as recited in claim 1 or a constraining means in contact with the passive damping means as recited in claim 18, Appellants respectfully contend that independent claims 1 and 18 are not anticipated by *Fuller* nor are claims 3, 6, 9, and 12 which depend from claim 1. In light of these arguments, reversal of the rejection of claims 1, 3, 6, 9, 12, and 18 under 35 U.S.C. § 102(e) is respectfully solicited.

(B) Rejection under 35 USC §102(b) over U.S. Patent 5,315,203

(i) Claims 1, 7, 9, and 18 are argued together for purposes of this Appeal.

The Examiner has also rejected claims 1, 7, 9, 15 and 18 under 35 U.S.C. § 102(b) as being anticipated by *Bicos* (US 5,315,203). Independent claim 1 recites a device for reducing vibration in a section of material comprising an active damper located at a first distance from the material, a passive damper located at a second distance from the material, wherein the second distance is greater than the first distance, and a constraining layer in contact with the passive damper. In a somewhat similar manner, independent claim 15 recites an actuator attached to the surface of the material comprising at least one piezoelectric element, a viscoelastic portion, and a constraining layer having a higher stiffness than the viscoelastic portion, wherein the device functions to reduce noise by the actuator damping specific sound modes. Also somewhat similar, independent claim 18, recites the step of bonding an actuator having active damping means, passive damping means and a constraining means in contact with the passive damping means to a desired portion of a section of material. Thus, all currently pending independent claims (i.e.

claims 1, 15 and 18) require a constraining layer or means in combination with either an active damper (claim 1), an actuator damping specific sound modes (claim 15) or an active damping means (claim 18).

No such structure or cooperation of structure is disclosed by *Bicos*. In particular, with regard to independent claims 1 and 18, both *Bicos* fails to teach or suggest an active damper or active damper means in combination with a constraining layer or constraining means. While *Bicos* includes a piezoelectric material that is actively controlled (piezoelectric element 12 in *Bicos*), such materials operate as a constraining layer. Furthermore, in stating the rejection the Examiner identifies, as analogous to the recited active damper, a piezoelectric material that operates solely as a sensor to generate an output signal for controlling a constraining layer (piezoelectric element 14 in *Bicos*). This identified structure (i.e. the piezoelectric element 14 in *Bicos*) does not operate so as to perform an active damping function, and, as such, does not constitute an active damper or active damper means as meant to one of ordinary skill in this field.

The Examiner's Answer states that the electroactive element described in Appellants' specification in paragraph 0036 on page 8 "clearly disclose[s] that the electroactive element 201 operates as a sensor in a similar manner to as Bicos." Appellants respectfully disagree that electroactive element operates as a sensor. Appellants contend that electroactive element 201 is behaving as an active damper addressing mechanical deformation. The mechanical deformation is dissipated by having the electroactive element 201 convert mechanical energy to electrical energy. This electrical energy is sent from the electroactive element to the electrode component (which is also part of Appellants' active damper), where the electrode dissipates the received electrical energy. Thus, the electrode and electroactive element 201 operate in conjunction to behave as an *active damper* as Appellants' claim. The *constraining layer* of Appellants' claimed device is separate from this active damper layer. In *Bicos*, the piezoelectric element 14 (which is buried in the structural member 10) acts as a sensor to piezoelectric element 12 (i.e., the *constraining layer*, which is separate from the location of element 14), such that element 12 is electrically controlled to deform so as to constrain layer 16 based on the signal sent from element 14. This is clearly different than the electrode and electroactive element that comprise the active damper of Appellants'

claimed invention, as the positioning and function of the elements of *Bicos* operate as constraining layer.

Thus, *Bicos* does not identically disclose an active damper (as recited in claim 1), or an active damping means (as recited in claim 18) in addition to a constraining layer or means as recited in the claims.

(ii) Claim 15 is argued individually for purposes of this Appeal.

In addition to the above arguments with respect to independent claims 1 and 18, the piezoelectric element 14 in *Bicos* does not identically constitute an actuator damping specific sound modes (as recited in claim 15) since this sensor of *Bicos* merely outputs a control signal and does not actually perform a damping function in general or damping of specific modes in particular.

Thus, Appellant respectfully contends that independent claims 1, 15, and 18 (and their dependent claims) are not anticipated by *Bicos* because *Bicos* fails to identically disclose every feature recited in these claims. In light of these arguments, reversal of the rejection of claims 1, 7, 9, 15, and 18 based on *Bicos* is requested.

(C) Rejection under 35 USC §102(b) over U.S. Patent 5,485,053

(i) Claims 1, 7, 8, 9, 15, and 18 are argued together for purposes of this Appeal.

The Examiner has also rejected claims 1, 7, 8, 9, 15 and 18 under 35 U.S.C. § 102(b) as being anticipated by *Baz* (US 5,485,053). Independent claim 1 recites a device for reducing vibration in a section of material comprising an active damper located at a first distance from the material, a passive damper located at a second distance from the material, wherein the second distance is greater than the first distance, and a constraining layer in contact with the passive damper. In a somewhat similar manner, independent claim 15 recites an actuator attached to the surface of the material comprising at least one

piezoelectric element, a viscoelastic portion, and a constraining layer having a higher stiffness than the viscoelastic portion, wherein the device functions to reduce noise by the actuator damping specific sound modes. Also somewhat similar, independent claim 18, recites the step of bonding an actuator having active damping means, passive damping means and a constraining means in contact with the passive damping means to a desired portion of a section of material. Thus, all currently pending independent claims (i.e. claims 1, 15 and 18) require a constraining layer or means in combination with either an active damper (claim 1), an actuator damping specific sound modes (claim 15) or an active damping means (claim 18).

No such structure or cooperation of structure is disclosed by *Baz*. In particular, with regard to independent claims 1 and 18, *Baz* fails to teach or suggest an active damper or active damper means in combination with a constraining layer or constraining means. While *Baz* includes a piezoelectric material that is actively controlled (material 50 in *Baz*), such material operates as a constraining layer. Furthermore, in stating the rejection the Examiner identifies, as analogous to the recited active damper, a piezoelectric material that operates solely as a sensor to generate an output signal for controlling a constraining layer (sensor 40 in *Baz*). This structure, (i.e. the sensor 40 in Baz) does not operate so as to perform an active damping function, and, as such, does not constitute an active damper or active damper means as meant to one of ordinary skill in this field.

The Examiner's Answer states that the electroactive element described in Appellants' specification in paragraph 0036 on page 8 "clearly disclose[s] that the electroactive element 201 operates as a sensor in a similar manner to as Baz." Appellants respectfully disagree that electroactive element operates as a sensor. Electroactive element 201 behaves as an active damper addressing mechanical deformation. The mechanical deformation is dissipated by having the electroactive element 201 convert mechanical energy to electrical energy. This electrical energy is sent from the electroactive element to the electrode component (which is also part of Appellants' active damper), where the electrode dissipates the received electrical energy. Thus, the electrode and electroactive element 201 operate in conjunction to behave as an *active damper* as Appellants' claim. The *constraining layer* of Appellants' claimed device is

separate from this active damper layer. In *Baz*, the piezo-sensor 40 (located adjacent to the flexible structure 20) sends control signals to piezo-constraining layer 50 (i.e., the constraining layer). This is clearly different than the electrode and electroactive element of the active damper of Appellants' claimed invention, as the positioning and function of the elements of *Baz* operate as constraining layer to control deflection.

Thus, *Baz* fails to disclose an active damper (claim 1), or an active damping means (claim 18) in addition to a constraining layer or means as recited in the claims.

(ii) Claim 15 is argued individually for purposes of this Appeal.

In addition to the above arguments with respect to independent claims 1 and 18, the sensor 40 in *Baz* does not identically constitute an actuator damping specific sound modes (as recited in claim 15) since this sensor of *Baz* merely outputs a control signal and does not actually perform a damping function in general or damping of specific modes in particular.

Thus, Appellant respectfully contends that independent claims 1, 15, and 18 (and their dependent claims) are not anticipated by *Baz*. In light of these arguments, reversal of the rejection of claims 1, 7, 8, 9, 15, and 18 based on *Baz* is respectfully solicited.

(D) Rejection of claim 7 under 35 USC §103(a) over U.S. Patent No. 6,700,304 in view of U.S. Patent 5,261,200

(i) Claim 7 is argued individually for purposes of this Appeal

Claims 7 stands rejected under 35 U.S.C. § 103 as unpatentable over a combination of *Fuller et al.* (6,700,304) in view of one or more additional references. The additional reference(s) is included as teaching or suggesting the specific limitation of dependent claim 7, while the primary reference (*Fuller et al.*) is applied to the limitations from base claim 1 as explained in the earlier rejections. For the

reasons explained above with respect to claim 1, Appellant urges that *Fuller et al.* do not teach or suggest all the features recited in claim 1 and, therefore, even in combination with the various other references, no such combination teaches or suggests all the limitations in claim 7. In light of these arguments, reversal of the rejection of claim 7 under 35 U.S.C. § 103 is respectfully requested.

(E) Rejection of claim 8 under 35 USC §103(a) over U.S. Patent 6,700,304 in view of U.S. Patent No. 5,261,200 further in view of U.S. Patent No. 6,501,644.

(i) Claim 8 is argued individually for purposes of this Appeal

Claims 8 stands rejected under 35 U.S.C. § 103 as unpatentable over a combination of *Fuller et al.* (6,700,304) in view of one or more additional references. The additional reference(s) is included as teaching or suggesting the specific limitation of dependent claim 8, while the primary reference (*Fuller et al.*) is applied to the limitations from base claim 1 as explained in the earlier rejections. For the reasons explained above with respect to claim 1, Appellant urges that *Fuller et al.* do not teach or suggest all the features recited in claim 1 and, therefore, even in combination with the various other references, no such combination teaches or suggests all the limitations in claim 8. In light of these arguments, reversal of the rejection of claim 8 under 35 U.S.C. § 103 is respectfully requested.

(F) Rejection of claim 11 under 35 USC §103(a) over U.S. Patent No. 6,700,304 in view of U.S. Patent Application Publication No. 20020092699.

(i) Claim 11 is argued individually for purposes of this Appeal

Claims 11 stands rejected under 35 U.S.C. § 103 as unpatentable over a combination of *Fuller et al.* (6,700,304) in view of one or more additional references. The additional reference(s) is included as teaching or suggesting the specific limitation of dependent claim 11, while the primary reference (*Fuller et al.*) is applied to the limitations from base claim 1 as explained in the earlier rejections. For the reasons explained above with respect to claim 1, Appellant urges that *Fuller et al.* do not teach or suggest all the features recited in claim 1 and, therefore, even in combination with the various other references, no such combination teaches or suggests all the limitations in claim 11. In light of these arguments, reversal of the rejection of claim 11 under 35 U.S.C. § 103 is respectfully requested.

(G) Rejection of claim 8 under 35 USC §103(a) over U.S. Patent No. 5,315,203 in view of U.S. Patent No. 6,501,644.

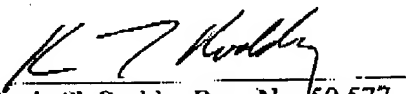
(i) Claim 8 is argued individually for purposes of this Appeal

Claims 8 stands rejected under 35 U.S.C. § 103 as unpatentable over a combination of *Bicos* (5,315,203) in view of one or more additional references. The additional reference(s) is included as teaching or suggesting the specific limitation of dependent claim 8, while the primary reference (*Bicos*) is applied to the limitations from base claim 1 as explained in the earlier rejections. For the reasons explained above with respect to claim 1, Appellant urges that *Bicos* does do not teach or suggest all the features recited in claim 1 and, therefore, even in combination with the various other references, no such combination teaches or suggests all the limitations in claim 8. In light of these arguments, reversal of the rejection of claim 8 under 35 U.S.C. § 103 is respectfully requested.

Conclusion

In view of the above remarks and arguments, Appellant believes that the imposed rejections of all remaining pending claims are unsupported in law and fact and reversal of such is respectfully requested. Applicants do not believe that any additional fees or charges are due for the prosecution of this appeal, however, in the event that there are, the Commissioner is authorized to charge any such additional fees or charges to the deposit account of appellants' assignee, Cymer, Inc., Deposit Account No. 03-4060.

Respectfully submitted,



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(8)
Claims Appendix
09/916,360

1. (previously presented): A device for reducing vibration in a section of material, said vibration causing an acoustic disturbance in a range of frequencies detectable by a target, the device comprising:

an active damper comprising an electroactive element in electrical communication with an electrode, the active damper located a first distance from said section of material;

a passive damper comprising a sound reducing material, said passive damper located a second distance from said section of material,

wherein said second distance is greater than said first distance, and wherein at least one of the active damper and the passive damper reduces the magnitude of the acoustic disturbance reaching the target; and

a constraining layer disposed in contact with said passive damper

2. (canceled)

3. (previously presented): The device of claim 1 wherein the constraining layer is aluminum.

4.-5. (canceled)

6. (original) The device of claim 1, wherein said active damper damps low frequency acoustic disturbances and said passive damper damps high frequency acoustic disturbances.

7. (original) The device of claim 1, wherein the sound reducing material comprises a viscoelastic material.

8. (previously presented) The device of claim 7 wherein said viscoelastic material is selected from the group of viscoelastic materials consisting of: 3M Damping Foil, Soundcoat Soundfoil, EAR Tad Pad and Sorbothane.

9. (original) The device of claim 1, wherein said active damper is in mechanical contact with said section of material.

10. (canceled)

11. (original) The device of claim 1, wherein the active damper comprises a QuickPack® actuator.

12. (original) The device of claim 1, wherein the active damper further comprises a compensator including at least one positive position feedback (PPF) filter implemented on a digital signal processor (DSP).

13.-14. (canceled)

15. (original) A device for reducing audible noise in a vehicle by reducing vibration of a vehicle section, comprising:

an actuator attached to a surface of the vehicle section, the actuator comprising at least one piezoelectric element and at least one electrode;

a viscoelastic portion which is located outside the actuator with respect to the surface of vehicle section; and

a constraining layer having a higher stiffness than said viscoelastic portion;

wherein the at least one piezoelectric element and the at least one electrode are in electrical communication with each other; the constraining layer is in mechanical contact with the viscoelastic layer and wherein the device functions to reduce noise by the actuator damping specific sound modes and by the viscoelastic portion damping all of the sound modes.

16-17. (canceled)

18. (previously presented) A method of damping vibration in a section of material, said vibration causing noise audible to a human ear, comprising the steps of:

bonding an actuator having active damping means, passive damping means and a constraining means in contact with the passive damping means to a desired portion of the section of material;

activating the active damping means to damp low frequency vibration in the section of material;

wherein the active damping means and the passive damping means together reduce noise to a greater extent than would be possible if the active damping means or the passive damping means act alone.

(9)

Evidence Appendix

09/916,360

None

(10)

Related Proceedings Appendix

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